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(54)Process for Preparing Nonwoven or Pile Nonwoven Knit Goods from Longitudinally Oriented Fiber Nonwovens

(57) The invention involves a process for preparing nonwoven or pile nonwoven knit goods from longitudinally oriented fiber nonwovens on warp knitting machines or stitch-bonding machines.

The object of the invention is to place certain kinds of fibers, fiber types and the like in specific sites in nonwoven or pile nonwoven knit goods to achieve certain effects.

According to the invention, two or more fiber nonwovens are fed to the stitch-bonding site, engaged by a stopping device at different time points and passed together to the processing elements.

Description

The invention is used in processing fiber nonwovens, preferably longitudinal fiber nonwovens, to make nonwoven or pile nonwoven knit goods by direct conversion of the fibers to loops. The processing of longitudinally oriented fiber nonwovens is known.

In most cases, the longitudinally oriented fiber webs issuing from nonwoven formation are stacked and directed laterally to the production device. The result is laterally oriented fiber nonwovens of relatively high weight.

Longitudinally oriented fiber nonwovens of lower weight (about 40 g/m^2) are used in the Voltex process (DD-PS 39 819). The fibers of the nonwoven are incorporated in a prefinished carrier web and in doing so, are laid down by a means of forming pile fiber loops. This results in pile fiber circular knits disposed longitudinally. Without the carrier web, there are no pile fiber circular knits.

In the Kunit process (DD-PS 2 82 585), the longitudinally oriented fibers of the nonwoven are processed without a web to make nonwoven knit goods. This also results in pile folds, which, however, are arranged in the lateral direction. Means for forming pile loops, such as, for example, lifting wires or the like, are not used.

In both instances, fiber mixtures can be processed without problems. However, this does not succeed in placing certain fibers or fiber types in specific sites. The reason is that fiber mixtures must be homogeneous and must be so passed to the processing rollers. Therefore, all fibers are represented uniformly in all layers of the product.

The object of the invention is to place certain kinds of fibers, fiber types or the like in specific sites in the nonwoven or pile nonwoven knit goods. This means that certain fiber types are grouped only in the loop area or in the pile fold area. The result is that some of the fibers having certain properties can be effective only in selected areas, or a layered construction of the nonwoven knit goods becomes possible from the standpoint of the construction of the pile folds.

According to the invention, two or more fiber nonwovens are fed simultaneously but separated to the stitch-bonding site, engaged by a stopping device and passed together to the processing elements. Thus, each nonwoven has a different incorporation ratio and is integrated into predetermined areas of the nonwoven or pile nonwoven knit goods, depending on the arrangement.

According to the invention, two or more nonwovens of fiber materials having different characteristic data, thus different special properties, are incorporated in a defined manner in the product cross-section. Adherable, shrinkable or similar specialty fibers can be incorporated, especially in the loop area. These fibers can also be interspersed in the loop area, blown in or brought in by other means. Shredded, cut or otherwise separated fibers or even continuous filaments can be incorporated in this manner.

When three nonwovens are processed, special fiber types, such as, for example, glass fibers, mineral fibers, carbon fibers or filaments can be incorporated in the middle nonwoven to achieve very specific effects appropriate for the field of use for the finished product. Similarly, the use of individual or nonwoven type bonded fibers or filaments of synthetic, mineral or metallic material is possible.

If necessary, thin, flexible, foamed material or the like can be fed between two nonwovens as a filler layer or fibrous or yarn-like granulates can be applied by spreading, blowing or other means.

The essence of the invention is that the simultaneous processing or two or more longitudinally oriented nonwovens permits a layered construction of the pile folds and consequently the products.

The invention enables, for example, the formation of underhair and guard hair for imitation furs and broadens considerably the range of uses for nonwoven or pile nonwoven knit goods. As is usual with nonwoven knit goods and similar products, the loop side, for example, in imitation furs is normally reinforced with chemicals and the like, that is, the fibers are bonded or adhered together and thus clearly affect properties. The invention enables circumventing the additional bonding process and placing suitable fibers in the loop area – and only there – so that they assume the bonding function after appropriate treatment. Thus, these are present only in the loop area, that is, such fibers are not contained in the pile folds.

In the processing of colored fibers, the loop side can be of a color different from the pile folds. All fiber types can be processed together. This means that a light fiber nonwoven of cotton-like chemical or synthetic fibers can be used in the loop area, and fibers having wool fineness can be used exclusively in the pile area.

Furthermore, when using three fiber nonwovens simultaneously, an intermediate hair area can be produced between the loop area and the pile fold area, using fibers different from the material of the loop area and the pile fold area. Each of these nonwovens should be considered as such and have other incorporation settings. Thus, the incorporation ratios for the nonwoven can be:

loop side, ca. 1:3, for
intermediate area ca. 1:5 and for the
pile fold area ca. 1:10.

All nonwovens are fed simultaneously to the processing needles from a single stopping device and pressed onto the needle hooks. The fiber loops are then produced from fibers of all three components, while, for example, only one component can be contained in the pile. The invention also covers the situation whenever, instead of nonwovens that are placed only on the loop side, single or isolated fibers, filaments or the like are scattered, blown or otherwise arranged on the processing elements so that they can be engaged by the processing elements and shaped into loops.

To engage the fibers or nonwovens securely on the loop side, appropriate motion of the down sinker or parts thereof or other configurations ensure that the scattered fibers or fiber nonwoven is located in an area in which the fibers can be engaged by the needle, that is, the hook to pick up the fibers is still open.

The invention is explained in more detail in an example, without limiting the possibility of varying the invention. The drawings show:

Fig. 1a, 1b: the arrangement of two fiber nonwovens,

Fig. 2: the arrangement of three fiber nonwovens,

Fig. 3: the construction of the pile folds in three fiber nonwovens.

The work area comprises, in a known manner, slide needles **1**, closing wires **2**, sinkers **3** and support rails **4**. The configuration is conventional. There is a vibrating stopping device **5** that engages the fibers of the nonwoven and presses them onto the hooks of the needles. The fiber nonwovens **6** and **7** are also present (Fig. 1a). Fiber nonwoven **6** comprises, for example, cotton-like synthetic fibers having special properties. Nonwoven **7** comprises wool-type fibers that form the vertically oriented pile folds **8**. Nonwoven **6** is placed only in the loop area.

Nonwoven **7** is engaged by the movement of the stopping device **5** and shaped into the fold **8**, placing it in the hook of the needle **1** (Fig. 1b). During the last part of the movement, nonwoven **6** is also engaged by the stopping device **5**, clinched and laid on the hook. This shapes the fibers of nonwoven **6** as well as the fibers of nonwoven **7** into loops **9**. However, both nonwovens are processed with different incorporation settings, because the time points when the stopping device engages the nonwovens are different. Figures 1a and 1b illustrate this clearly. While nonwoven **7** is engaged and already folded (Fig. 1a), nonwoven **6** is not engaged. Only at the moment of placement (Fig. 1b) is it also engaged and placed on the hook.

Fig. 2 shows the arrangement with three nonwovens. Nonwovens **6** and **7** are as defined in Fig. 1. Nonwoven **10** is to form "under hair" in the product and comprises medium length, medium fine fibers. During the operating cycle, the stopping device **5** first engages nonwoven **7**, then nonwoven **10** and finally nonwoven **6**. This means that nonwoven **7** forms the highest pile folds, nonwoven **10** forms medium high pile folds and nonwoven **6** appears only in the loop area. Each of these nonwovens has a different incorporation ratio. Nonwoven **7** has the highest, nonwoven **6** the lowest. Nonwoven **10** lies in-between. All three nonwovens are contained in the loop area.

This construction of the pile folds is clearly recognizable in Fig. 3. While nonwoven **6** appears only in the loops, nonwovens **7**; **10** form the superposed pile folds.

Reliable performance of the process requires that the hook of needle **1** remains open until all components are engaged in the hook. Only then is a covering possible. To ensure this, the lag of the closing elements can be modified, or the nonwovens, primarily nonwovens **6** and **10**, are moved at the right moment from the sinkers **3** into the engaging area of the opened hook.

That can be ensures by moving the sinkers or parts thereof forward. These movements must be synchronized with the needle movement.

Key to Reference Numbers

1	Slide needle
2	Closing wire
3	Sinker
4	Support rails
5	Stopping device
6, 7	Fiber nonwovens
8	Pile folds
9	Loops
10	Nonwoven

Patent Claims

1. Process for preparing nonwoven or pile nonwoven knit goods from longitudinally oriented fiber nonwovens on warp knitting or stitch-bonding machines characterized in that two or more fiber nonwovens are fed simultaneously but separated to the stitch-bonding area, engaged by a stopping device at different time points and passed together to the processing elements, whereby each nonwoven has a different incorporation ratio and is integrated into predetermined areas of the nonwoven or pile nonwoven knit goods, depending on the arrangement.

2. Process according to Claim 1, characterized in that two or more nonwovens of fiber materials having different characteristics are fed in and these fiber materials having special properties are incorporated in the product cross-section in a defined manner.

3. Process according to Claim 1, characterized in that adherable, shrinkable or other special fibers are integrated in the loop area.

4. Process according to Claim 1, characterized in that the special fibers are scattered in, blown in or applied in another manner.

5. Process according to Claim 1, characterized in that cut, shredded, otherwise separated or even continuous filaments are integrated in the loop area.

6. Process according to Claim 1, characterized in that the fiber nonwoven or single or isolated fibers or filaments are moved synchronously from the knock-over edge by the sinker, parts thereof or an additional arrangement so that they reach the engaging area of the processing elements.

7. Process according to Claim 1, characterized in that special fiber types, such as, for example, glass, mineral, carbon fibers or filaments are incorporated as the middle nonwoven to obtain certain effects.

8. Process according to Claim 1, characterized in that individual or nonwoven type bonded fibers or filaments of synthetic, metallic or mineral material are incorporated as the middle or filler layer.

9. Process according to Claim 1, characterized in that thin, foldable foamed material or the like are incorporated between two nonwovens as the middle or filler layer.

10. Process according to Claim 1, characterized in that fibrous or fiber-like granulates are scattered , blown or otherwise applied between two nonwovens as the middle or filler layer.

Translation: Language Services
Philip M. Levin, Sci-Tech Translation Service
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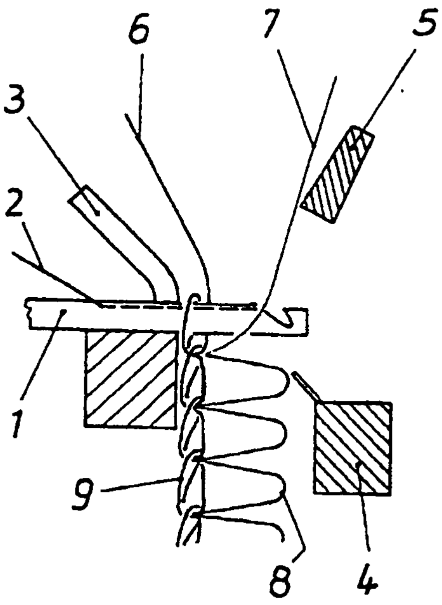

Fig. 1a

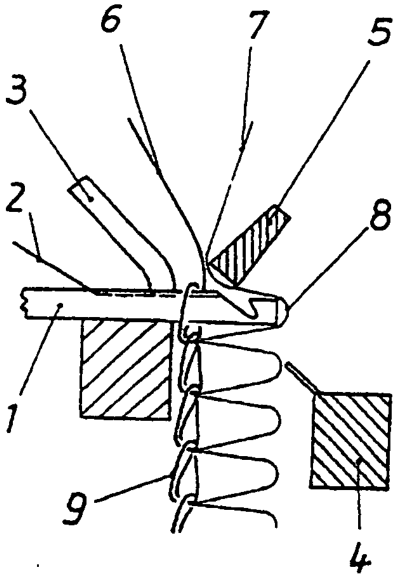

Fig. 1b

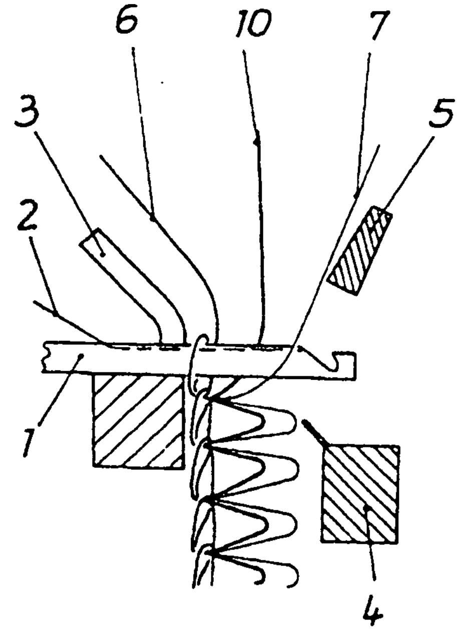

Fig. 2

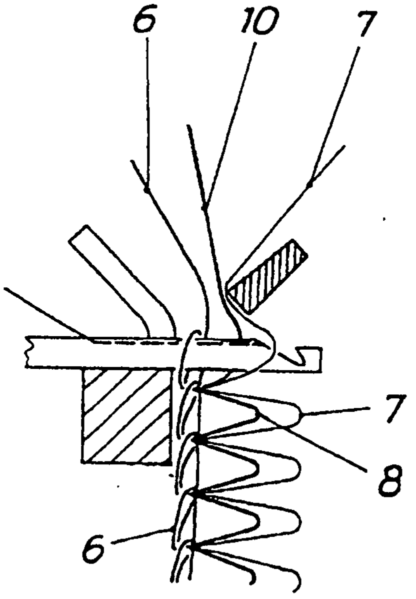

Fig. 3